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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/568,126	02/14/2006	Yasuo Masuda	SHIGA7.045APC	1055

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EXAMINER	
CHU, JOHN S Y	

ART UNIT	PAPER NUMBER
1795	

NOTIFICATION DATE	DELIVERY MODE
12/05/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/568,126	MASUDA ET AL.	
	Examiner	Art Unit	
	John S. Chu	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 September 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *13-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *13-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *See Continuation Sheet*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :9/26/07,4/24/07,12/14/06,11/1/06,.

DETAILED ACTION

This Office action is in response to the amendment filed September 26, 2007.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 13-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over BASSETT et al (5,145,763) in view of MIZUTA et al (6,869,742) **further in view of LEE et al (2003/01655770)**, with the combination of KOMANO (4,847,178), NISHIO et al (6,010,816) and MISUMI et al (2003/0059706).

The claimed invention is drawn to the following:

> 13. (New) A positive photoresist composition formed by dissolving (A) photosensitive novolak resin comprising an alkali soluble novolak resin wherein 3 to 7 mol% of hydrogen atoms within those of all phenolic hydroxyl groups of the alkali soluble novolak resin are substituted by 1,2-naphthoquinone diazide sulfonyl groups, wherein the alkali soluble novolak resin before substitution by 1,2-naphthoquinone diazide sulfonyl groups has been fractionated by weight to produce a degree of dispersion of 2.2 to 2.8, in (B) an organic solvent comprising 70 to 90% by weight of a propylene glycol alkyl ether acetate, and ethyl lactate.

BASSETT et al discloses a positive resist composition comprising a reaction product of a novolak resin and a naphthoquinonediazide sensitizer. The solvent used to formulate the composition is disclosed column 8, lines 58-66 which include propylene glycol monomethyl ether acetate, and mixtures with those other listed solvents thereof.

The o-quinone diazide compound is reacted in an amount of 5 to 10% based on the theoretical molar level of hydroxyl groups in the resin, thus the endpoints of the preferred range fall within the claimed range of the claimed proportions of the substituted hydrogen atoms as recited in claim 2. The method as claimed in claim 7 is met by the disclosure in column 9, lines 7-29 wherein the composition is coated, baked, exposed and developed.

MIZUTA et al discloses a positive photoresist composition comprising a photosensitive novolak resin, a quinone diazide sulfonyl ester compound and a sensitizer. The novolak resin used to form the photosensitive resin is found in column 10, lines 33-35 wherein said Mw/Mn of the novolak resin is in range from 2.2 to 2.8. The percentage of the hydrogens substitute with a naphthoquinonediazide sulfonyl group on the novolak resin is disclosed to be 3.8% as seen in column 11, lines 39-41, which falls in the recited range as now recited in new claims 8 and 9.

Newly cited reference to LEE et al addresses the new limitation recited in claim 13 wherein the organic solvent is 70-90% by weight of propylene glycol alkyl ether acetate, and ethyl lactate. Applicants are directed to LEE et al page 5, paragraph [0042] wherein the organic solvent is disclosed to be "More preferably, PGMEA alone or a mixture of PGMEA and EL in a ratio of 9:1 to 7:3 by weight..." This clearly suggest the ratio of the claimed solvent mixture as recited in claim 13 and motivates the skilled artisan to use such a mixture of solvents with the reasonable expectation of forming a photoresist composition which is uniform in layer thickness and critical in dimension.

Each of the following newly cited prior art references disclose the use of acrylate polymers as good plasticizers in photoresist compositions with quinone diazide containing photosensitive ingredients, see column 3, lines 38-40 in KOMANO

(4,847,178), column 7, lines 11-18 in NISHIO et al (6,010,816) and paragraph [0023] – [0029] in MISUMI et al (2003/0059706).

It would have been *prima facie* obvious to one of ordinary skill in the art of positive photoresist compositions to substitute the novolak resin in MIZUTA et al as the photosensitive novolak resin in BASSETT et al and reasonably expect same or similar results as disclosed in BASSETT et al high resolution, sensitivity and definition. It would also have been *prima facie* obvious to one of ordinary skill in the art positive photoresist compositions to have a reaction percentage of about 3.8% of the hydrogen atoms on the novolak resin for the photoresist resist composition as recited in MIZUTA et al and expect same or similar results such as as disclosed in MIZUTA et al

Finally it would have been *prima facie* obvious to the skilled artisan to add a known plasticizer such as acrylate polymers into the composition and reasonably expect excellent coating properties, flexibility and anti-brasion properties to the photoresist composition.

And it would have been *prima facie* obvious to the skilled artisan to use a solvent mixture as recited in LEE et al wherein the ratio of PGMEA to ethyl lactate (EL) is 9:1 to 7:3 and reasonably expect same or similar results as recited in LEE et al for forming a photoresist composition which is uniform in layer thickness and critical in dimension.

3. Claims 13-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over OKAZAKI et al (5,422,221) in view of NISHI et al (5,759,736), MIZUTA et al

(6,869,742) **further in view of LEE et al (2003/01655770),** with the combination of KOMANO (4,847,178), NISHIO et al (6,010,816) and MISUMI et al (2003/0059706).

The claimed invention has been recited above and is included by reference.

OKAZAKI et al discloses a positive photoresist composition comprising a photosensitive novolak resin having 3% to 27 mol percent of the hydrogen atoms on the resin replaced with a 1,2-naphthoquinonediazide-sulfonyl group, see column 2, line 49-column 3, line 2. The resin used in the condensation reaction has a weight average molecular weight of 1,000 to 10,000.

OKAZAKI et al lacks a working example comprising a photoresist composition comprising a mixture of an ethyl lactate solvent and a propylene glycol alkyl ether acetate mixture as recited in claim 6.

NISHI et al disclose positive working photoresist compositions comprising novolak resin, which has been esterified with a quinonediazide compound and dissolved in a solvent mixture of ethyl lactate and propylene glycol monomethyl ether acetate. The use of a mixture of solvents is known and disclosed in column 6, line 49 – column 7, line 10 and include ethyl lactate and propylene glycol monomethyl ether acetate, in fact Example 1 uses that exact solvent mixture, see column 8, lines 20-40.

MIZUTA et al discloses a positive photoresist composition comprising a photosensitive novolak resin, a quinone diazide sulfonyl ester compound and a sensitizer. The novolak resin used to form the photosensitive resin is found in column 10, lines 33-35 wherein said Mw/Mn of the novolak resin is in range from 2.2 to 2.8. The percentage of the hydrogens substitute with a naphthoquinonediazide sulfonyl group on the novolak

resin is disclosed to be 3.8% as seen in column 11, lines 39-41, which falls in the recited range as now recited in new claims 8 and 9.

Newly cited reference to LEE et al addresses the new limitation recited in claim 13 wherein the organic solvent is 70-90% by weight of propylene glycol alkyl ether acetate, and ethyl lactate. Applicants are directed to LEE et al page 5, paragraph [0042] wherein the organic solvent is disclosed to be "More preferably, PGMEA alone or a mixture of PGMEA and EL in a ratio of 9:1 to 7:3 by weight..." This clearly suggest the ratio of the claimed solvent mixture as recited in claim 13 and motivates the skilled artisan to use such a mixture of solvents with the reasonable expectation of forming a photoresist composition which is uniform in layer thickness and critical in dimension.

Each of the prior art references disclose the use of acrylate polymers as good plasticizers in photoresist compositions with quinone diazide containing photosensitive ingredients, see column 3, lines 38-40 in KOMANO (4,847,178), column 7, lines 11-18 in NISHIO et al (6,010,816) and paragraph [0023] – [0029] in MISUMI et al (2003/0059706).

It would have been *prima facie* obvious to one of ordinary skill in the art of positive working photoresist compositions to use a mixture ethyl lactate and polypropylene glycol monomethyl ether acetate to dissolve the components of OKAZAKI et al and reasonably expect same or similar results with respect to smooth coating properties and excellent storage stability. It would also have been *prima facie* obvious to one of ordinary skill in the art of positive photoresist composition to substitute the novolak resin in MIZUTA et al as the photosensitive novolak resin in BASSETT et al and reasonably expect same or similar results as disclosed in BASSETT et al high

resolution, sensitivity and definition and have a reaction percentage of about 3.8% of the hydrogen atoms on the novolak resin substituted with a naphthoquinonediazide sulfonyl group and expect same or similar results such as disclosed in MIZUTA et al.

Finally it would have been *prima facie* obvious to the skilled artisan to add a known plasticizer such as acrylate polymers into the composition and reasonably expect excellent coating properties, flexibility and anti-brasion properties to the photoresist composition.

And it would have been prima facie obvious to the skilled artisan to use a solvent mixture as recited in LEE et al wherein the ratio of PGMEA to ethyl lactate (EL) is 9:1 to 7:3 and reasonably expect same or similar results as recited in LEE et al for forming a photoresist composition which is uniform in layer thickness and critical in dimension.

4. Claims 13-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over MIZUTA et al. **further in view of LEE et al (2003/01655770).**

The claimed invention has been recited above and is included by reference.

MIZUTA et al discloses a positive photoresist composition comprising a photosensitive novolak resin, a quinone diazide sulfonyl ester compound and a sensitizer. The novolak resin used to form the photosensitive resin is found in column 10, lines 33-35 wherein said Mw/Mn of the novolak resin is in range from 2.2 to 2.8. The percentage of the hydrogens substitute with a naphthoquinonediazide sulfonyl group on the novolak resin is disclosed to be 3.8% as seen in column 11, lines 39-41, which falls in the recited range as now recited in new claims 8 and 9.

MIZUTA et al discloses use of solvents for formulating the recited photoresist to included polypropylene glycol monomethyl ether acetate in column 8, lines 54-55 among other solvents.

Newly cited reference to LEE et al addresses the new limitation recited in claim 13 wherein the organic solvent is 70-90% by weight of propylene glycol alkyl ether acetate, and ethyl lactate. Applicants are directed to LEE et al page 5, paragraph [0042] wherein the organic solvent is disclosed to be "More preferably, PGMEA alone or a mixture of PGMEA and EL in a ratio of 9:1 to 7:3 by weight..." This clearly suggest the ratio of the claimed solvent mixture as recited in claim 13 and motivates the skilled artisan to use such a mixture of solvents with the reasonable expectation of forming a photoresist composition which is uniform in layer thickness and critical in dimension.

Each of the following prior art references disclose the use of acrylate polymers as good plasticizers in photoresist compositions with quinone diazide containing photosensitive ingredients, see column 3, lines 38-40 in KOMANO (4,847,178), column 7, lines 11-18 in NISHIO et al (6,010,816) and paragraph [0023] – [0029] in MISUMI et al (2003/0059706)

It would have been *prima facie* obvious to one of ordinary skill in the art of positive working photoresist compositions to use a mixture ethyl lactate and polypropylene glycol monomethyl ether acetate or polypropylene glycol monomethyl ether acetate alone to dissolve the components such as the novolak resin having a degree of dispersion of 2.2 to 2.8 as well as have about 3.8% of the hydrogen atoms on the novolak resin substituted with a naphthoquinonediazide sulfonyl group and expect same

or similar results such as disclosed in MIZUTA et al. for high resolution, sensitivity and definition

Finally it would have been *prima facie* obvious to the skilled artisan to add a known plasticizer such as acrylate polymers into the composition and reasonably expect excellent coating properties, flexibility and anti-brasion properties to the photoresist composition.

And it would have been *prima facie* obvious to the skilled artisan to use a solvent mixture as recited in LEE et al wherein the ratio of PGMEA to ethyl lactate (EL) is 9:1 to 7:3 and reasonably expect same or similar results as recited in LEE et al for forming a photoresist composition which is uniform in layer thickness and critical in dimension.

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Chu whose telephone number is (571) 272-1329. The examiner can normally be reached on Monday - Friday from 9:30 am to 6:00 pm.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Cynthia Kelly, can be reached on (571) 272-1526

The fax phone number for the USPTO is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PMR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/John S. Chu/
Primary Examiner, Group 1700

J.Chu
November 30, 2007